

ASHTON COAL MINE – LONGWALL/MINIWALL NO 9 DA 309-11-2001 – MOD 4

1 BACKGROUND

The Ashton Coal Mine is an underground and open cut coal mine located approximately 14 kilometres northwest of Singleton (see Figure 1). It is operated by Ashton Coal Operations Limited (Ashton), a subsidiary of Felix Resources Limited.

The Ashton mine is bordered by a number of other major open cut and underground mining operations. Camberwell Village is also located immediately adjacent to the mine, south of the open cut operations and east of the underground mine.

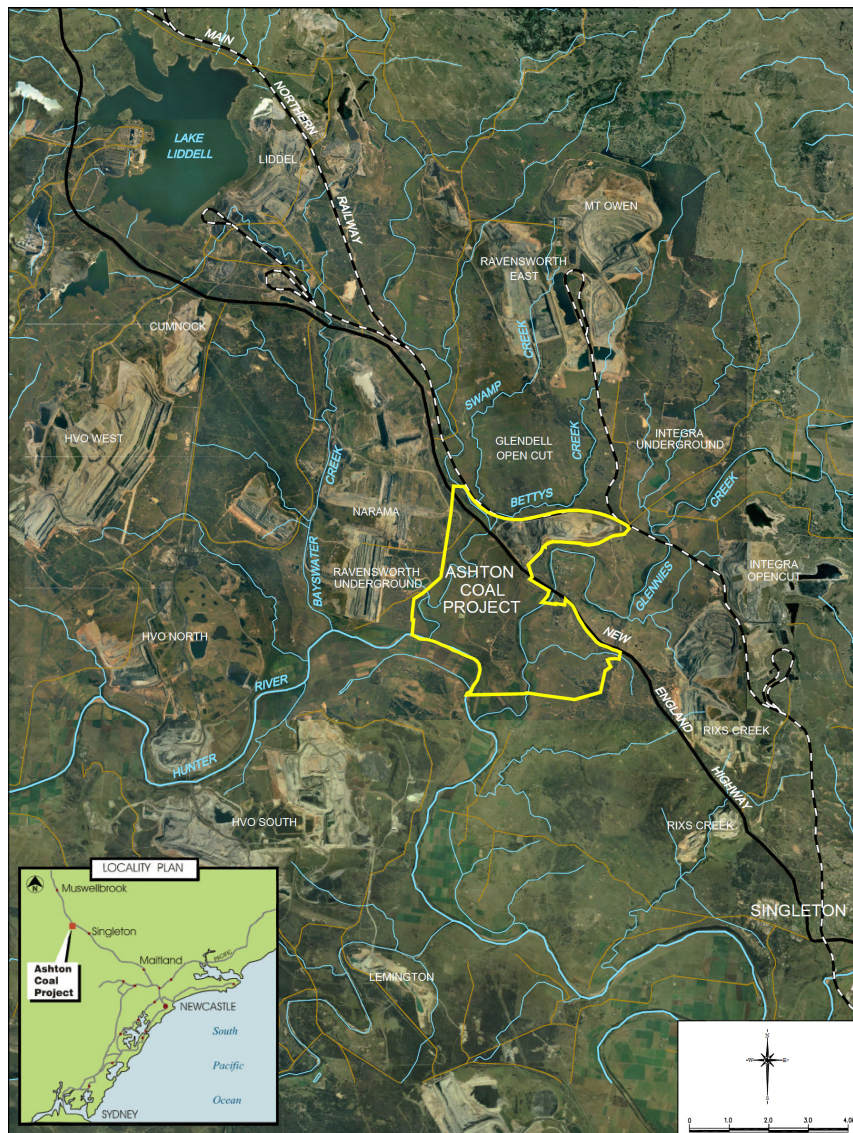


Figure 1: Location of Ashton Coal Mine

The mine currently operates under a Ministerial consent granted on 11 October 2002 (DA 309-11-2001). This consent allows Ashton to extract up to 5.2 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal a year from its open cut and underground mining operations, until 2023. Open cut operations are ongoing in the northeast of the mining lease with extraction due to finish in 2010.

Underground mining commenced in the western part of the lease in 2007, using longwall extraction methods, and is expected to continue until 2023. Due to concerns about the impacts on Bowmans Creek, Glennies Creek, their associated alluvium and the Hunter River, the mine plan was amended during the original consent process. The consent allows extraction of four coal seams outside the area of Bowmans Creek and its alluvium, but requires retention of the shallow seams (Pikes Gully and Upper Liddell) where the depth of cover to the creek and alluvium is less than 150 metres (m). The original mine plan showed seven longwalls in the Pikes Gully seam (LW1 to LW7), but Ashton has received approval under the Subsidence Management Plan (SMP) process to substantially shorten LW5 and LW6 and replace LW7 with two narrower longwalls (known as “miniwalls”). These changes were considered necessary to reduce subsidence-related impacts on Bowmans Creek and its alluvium to the extent permitted under the consent. The currently approved mine plan (including MW7 and MW8) is shown in Figure 2. To date, Ashton has extracted LW1 - LW3 and commenced extracting LW4 in March 2009. Extraction of LW5 is expected to commence in December 2009.

Ashton now proposes to maximise extraction from the Pikes Gully seam by adding a further longwall/miniwall panel to the already approved underground operations.

2 PROPOSED MODIFICATION AND NEED

In August 2009, Ashton lodged an application and supporting Environmental Assessment requesting a modification to its consent under section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Ashton proposes to mine an additional underground panel via a combination of longwall and miniwall extraction methods (LW/MW9). The proposed panel is located immediately west of approved LW1 - MW8 and within Ashton's current development consent boundary and mining lease (see Figure 2).

The panel would be mined for the full thickness of the Pikes Gully seam to recover 1.25 million tonnes of ROM coal. The southern section comprises a miniwall 93 m wide and 1500 m long, passing beneath Bowmans Creek. The miniwall section would leave a wide pillar of coal in place to reduce subsidence impacts on Bowmans Creek and its alluvium. Longwall mining, 141 m wide, would be utilised for the northern section of the panel, commencing 50 m north of Bowmans Creek alluvial boundary for a length of 1250 m and ending south of the New England Highway. Main headings would be developed for access to LW/MW9 as an extension of the approved headings for LW1 - MW8. These are located underneath and parallel to the New England Highway (see Figures 2 and 3). Ashton also proposes to increase production from the underground mine by 250,000 tpa of ROM coal, requiring an increase in total approved production from 5.2 to 5.45 Mtpa.

Ashton also proposes deletion of consent conditions 3.18, 3.24, 3.25, 3.26, 3.27 and 3.28 (which all relate to subsidence management) from Schedule 2 of the consent. The consent was granted prior to implementation of the Department of Industry and Investment's SMP process. Ashton considers that these consent conditions duplicate the requirements of the SMP process and are unnecessary.

It should be noted that Ashton lodged a separate modification application under section 75W in September 2009 for diversion of Bowmans Creek and re-design of the mine layout to allow additional extraction underneath the creek and alluvium via longwall methods.

Whilst that application is currently being assessed separately, it has implications for the proposed LW/MW9 modification. Essentially, mining of LW/MW9 would not occur as detailed in this proposal if the diversion of Bowmans Creek is approved. The proposed diversion of Bowmans Creek would allow for further longwall mining and would therefore alter the currently approved (and herein proposed) mine layout.

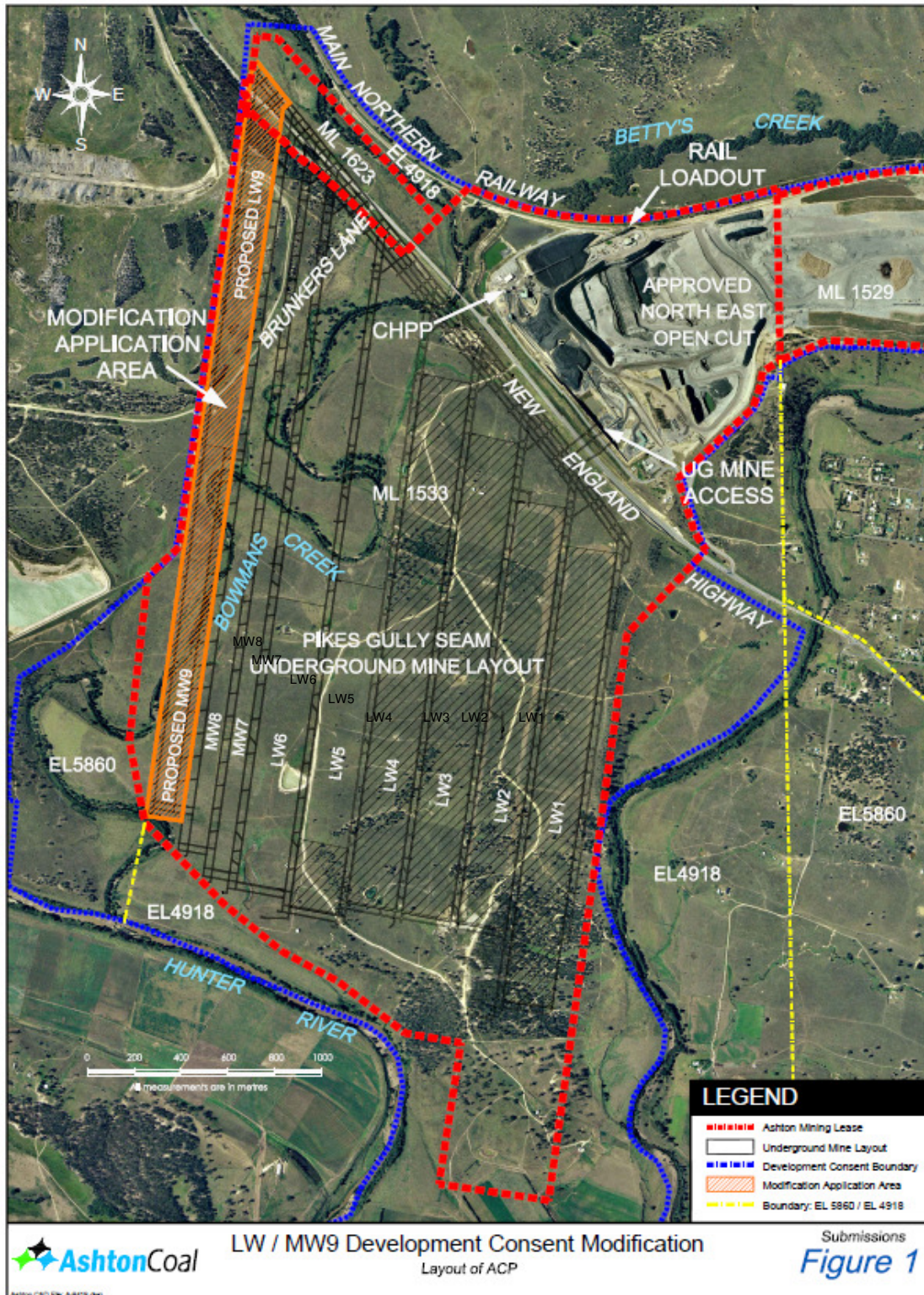


Figure 2: Ashton Underground Mine – Approved and Proposed Extraction in the Pike's Gully Seam

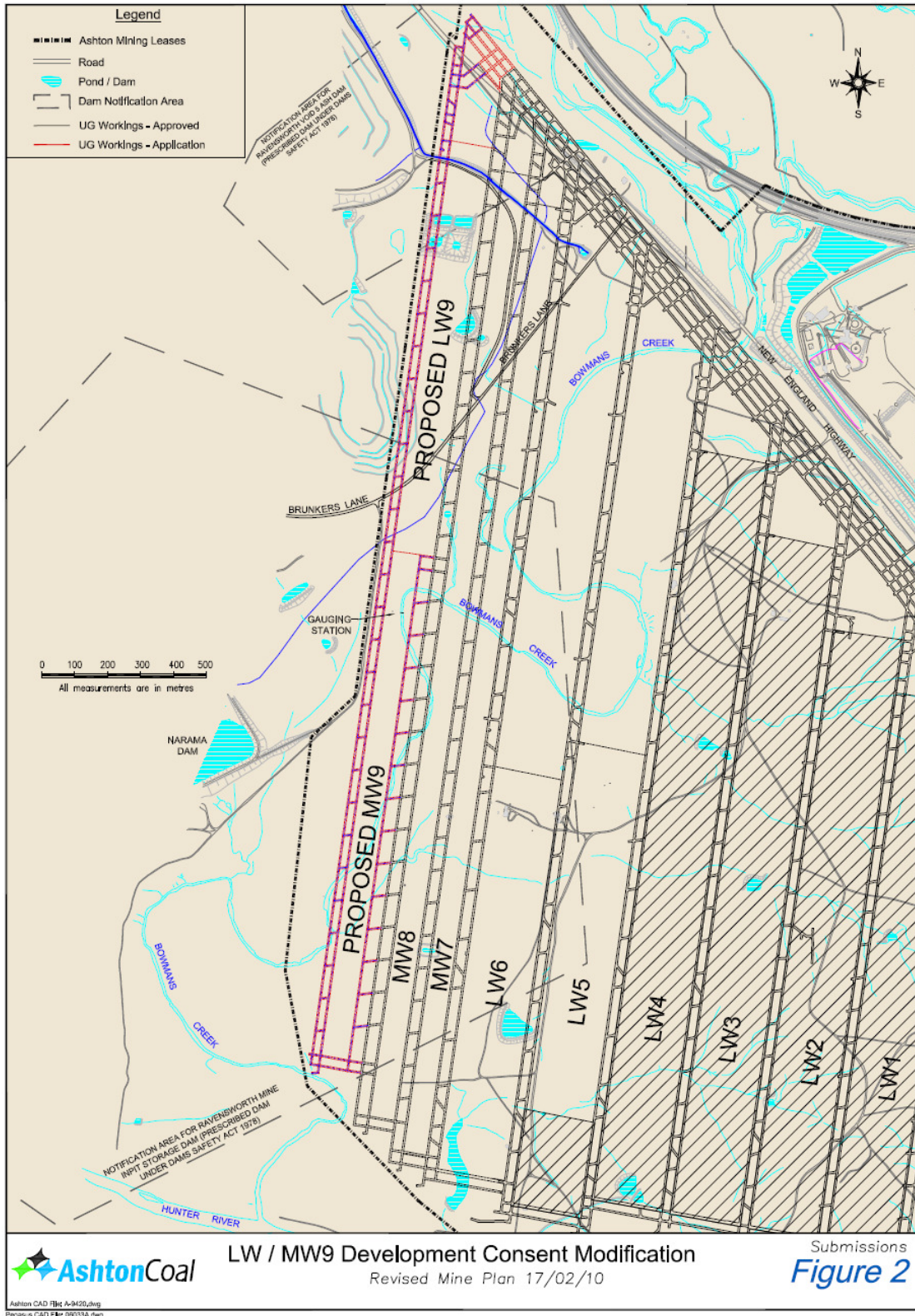


Figure 3: Proposed LW/MW9 and Surface Features

3 STATUTORY CONTEXT

Approval Authority

The Minister was the approval authority for the original development application, and is consequently the approval authority for this modification application. However, on 25 January 2010, the Minister delegated his powers and functions as an approval authority to modify certain project approvals under section 75W of the EP&A Act to the Director, Mining and Industry. This modification application meets the terms of this delegation. Under these circumstances, the Director may determine the application under delegated authority.

Modification

The Ashton mine has development consent under Part 4 of the EP&A Act. Ashton has sought to modify this consent under section 75W of Part 3A of the Act.

Under clause 8J(8)(b) of the *Environmental Planning and Assessment Regulation 2000*, a development consent in force immediately before the commencement of Part 3A may be modified under section 75W as if the consent were an approval under Part 3A, but only if:

- a) *the consent was granted with respect to development that would be a project to which Part 3A of the Act applies but for the operation of clause 6(2)(a) of State Environmental Planning Policy (Major Development) 2005, and*
- b) *the Minister approves of the development consent being treated as an approval for the purposes of section 75W of the Act.*

The then Minister gave approval to the consent being treated as an approval for the purposes of section 75W on 10 July 2008. While the modification process is taking place under Part 3A, the modified consent would remain a consent under Part 4 of the Act.

The proposed modification represents a minor extension of the approved underground operations. Extraction of an additional panel would be undertaken in accordance with approved mining methods and would lead to a minor increase in production volumes (less than 5%). It is recommended that the Director agree that the modification request falls within the scope of section 75W and the request can therefore be determined.

4 CONSULTATION

Under Section 75W of the EP&A Act the Department is not required to notify or exhibit the application. However, after accepting the EA for the proposal, the Department referred the application to the Department of Environment, Climate Change and Water (DECCW), Department of Industry and Investment (DII), NSW Office of Water (NOW), Roads and Traffic Authority (RTA), Singleton Shire Council (SSC), Dams Safety Committee (DSC) and neighbouring commercial operators (Macquarie Generation, Xstrata Coal NSW and Ravensworth Underground Mine) for comment.

In addition, Ashton invited registrations of interest from Aboriginal stakeholders via the Sydney Morning Herald and the Singleton Argus. Submissions were received from the Yarrawalk Aboriginal Corporation and the Wanaruah Custodians.

A summary of the issues raised is provided below.

Government Authorities

In general, the government authorities did not object to the proposal, however a number of issues were raised.

DECCW identified concerns regarding the management of identified Aboriginal heritage sites and the lack of evidence of support from Aboriginal stakeholders for proposed salvage works. However, DECCW provided recommended conditions for managing this

issue. DECCW also recommended that mining activities do not cause connective cracking (ie cracking which extends from the surface to the underground mine workings) underneath Bowmans Creek or its alluvium, to ensure protection of an endangered population of River Red Gums south of the site.

NOW also sought to ensure that no direct hydraulic connection (ie connective cracking) resulted between the Bowmans Creek alluvium and the underground mine workings. NOW also raised concern that the change point from longwall to miniwall mining is too close to the Bowmans Creek to avoid unacceptable impacts and recommended that it be moved 50-100 m to the north. NOW also provided a number of recommendations for reporting to verify subsidence and groundwater impact predictions and sought a commitment from Ashton to replace the loss of baseflows in Bowmans Creek.

DII did not object to the proposal but noted that the southern end of LW/MW9 is located outside of the company's existing mining lease. DII indicated that Ashton must hold a valid mining lease over the area prior to mining commencing.

Both the **RTA** and **DSC** did not raise any objection to the proposal. The DSC recommended that Ashton undertake monitoring to ensure the safety of dams on neighbouring mine sites.

Neighbouring Mines

Both Xstrata Coal (representing Ravensworth Underground Mine and Ravensworth Operations) and Macquarie Generation raised concerns over potential subsidence impacts to Brunkers Lane and other surface infrastructure. Both companies sought a commitment from Ashton to rectify any subsidence damage to their infrastructure. Xstrata also sought confirmation that any impacts to the alluvium and baseflow in Bowmans Creek would be attributed to Ashton, rather than the Ravensworth mines.

Aboriginal Stakeholders

Both the Yarrowalk Aboriginal Corporation and the Wanaruah Custodians indicated that they considered the area of the proposed additional underground mining to be of high cultural significance and objected to further development in the area.

Ashton has provided responses to the issues raised in submissions. The Department has considered the issues raised, and Ashton's response to these issues, in its assessment of the proposed modification.

5 ASSESSMENT

The Department considers the key issues for assessment are mine subsidence, groundwater, surface water and archaeology. Other issues include aquatic and terrestrial flora and fauna, air quality and noise.

5.1 Subsidence

The potential subsidence impacts from underground mining on Bowmans Creek and its connected alluvium were identified as a key issue during the assessment of the Ashton underground mine in 2002. This issue has influenced development of the mine plan over the course of operation and has resulted in various changes to the width and location of longwall and miniwall panels, such that these impacts can be minimised.

SCT Operations undertook the subsidence assessment for the EA and predicted the resulting impacts on surface infrastructure and natural features, including Bowmans Creek. Because one of the main factors influencing vertical subsidence is the width of the mined void, SCT assessed impacts associated with LW9 and MW9 separately.

Longwall 9

Maximum vertical subsidence of up to 1.2 m would occur. However, the majority of the resulting subsidence bowl would subside in the range of 0.5 - 1.0 m (see Figure 4). The majority of subsidence impacts would occur on land owned by Macquarie Generation, impacting on its access road, sedimentation ponds and Brunkers Lane. Predicted impacts on infrastructure and natural features and Ashton's proposed mitigation measures are summarised in Table 1 (see also Figures 3 and 4).

Table 1: Subsidence Impacts – Longwall 9

Aspect	Predicted Impact	Mitigation Measures
Brunkers Lane. This part-sealed private road is used by Xstrata and Macquarie Generation to access parts of their respective sites. Both landowners indicated that the road is likely to be used for the proposed realignment of Lemington Road, making it a public road carrying greater traffic volumes.	- Subsidence of up to 1.2 m, causing surface cracking and buckling of pavement and cracking in unsealed sections. - However, if Brunkers Lane is remade as Lemington Road prior to completion of mining in LW9 (expected in April 2012), then further detailed remedial works would be necessary to maintain and/or restore the road to a standard suitable for public use.	- Ashton has committed to the maintenance of Brunkers Lane in its current form, which may require regrading and filling of cracks. - The Department considers that Ashton should not be required to remediate any future realignment of Lemington Road, as it is a future proposal that is not yet approved.
Macquarie Generation private access road. This unsealed road runs across the northern part of LW9.	Perceptible cracking and grade changes.	Regrading and filling of cracks.
Macquarie Generation sedimentation ponds - four sedimentation ponds and a downstream dam located above LW9. The overburden depth is approximately 150 m.	Temporary and permanent tensile cracking, with up to 1 m of differential settlement across some ponds.	- Resealing of cracks in clay liners to the ponds and dam. - Develop an agreement with Macquarie Generation to empty the ponds during the period of undermining.
Buried polyethylene water pipes from Narama Dam to Mt Owen mine.	Significant impacts are not likely.	- Subsidence monitoring to confirm impact predictions. - Repair any damaged pipes.
Electricity lines (132 kV and 66 kV) on Macquarie Generation land.	Tilting and horizontal movement of individual poles.	Suspension of individual conductors in sheaves prior to mining commencing.
New England Highway (located 100 m from the finishing end of LW9).	The setback would avoid subsidence impacts.	None required.
Proposed Ravensworth Void 5 dam (located 250 m west of LW9).	Imperceptible impacts at Ravensworth Void 5 dam and the proposed water storage dam.	- Maintain the safety of the dam in accordance with requirements of the DSC. - Install a subsidence monitoring line toward Void 5 dam, after it is constructed.
Ravensworth Underground Mine (RUM). The main headings for LW/MW9 would be located approximately 40 m from the RUM main headings.	- If mined concurrently, the two mines would assist each other in achieving dewatering due to concurrent pumping. - Ashton would continue pumping on completion of mining the Pikes Gully seam to enable mining of the lower 3 seams (subject to separate assessment). Therefore, there would be minimal seepage across to RUM. - The Xstrata submission agreed with the predictions made in the assessment.	No additional conditions are considered necessary to manage mine water inflows to RUM.
General surface cracking across the site	Surface cracking over LW9 could allow ingress of surface water, ponding and erosion.	Filling of cracks.

Miniwall 9

The panel width for MW9 (93 m) has been limited to ensure a width to overburden depth ratio of 0.6 or less, to limit subsidence impacts on Bowmans Creek and its alluvium. Vertical subsidence is predicted to be approximately 0.2 m (see Figure 4). This level of predicted subsidence is considered unlikely to cause connective cracking of the alluvium; hence impacts on the water source would be avoided. Predicted impacts on natural features and infrastructure and Ashton's proposed mitigation measures are summarised in Table 2 (see also Figures 3 and 4).

Table 2: Subsidence Impacts – Miniwall 9 Southern Section

Aspect	Predicted Impact	Mitigation Measures
Bowmans Creek and connected alluvium.	• Subsidence of about 200 mm to affect about 100 m of the creek, with subsidence decreasing to less than 50 mm over the panel edges. • Minor ponding and tilting within the creek bed is predicted, however these impacts are considered to be within the natural variation of the creek bed.	• Monitoring to confirm predicted impacts. • Contingency measures for unexpected impacts.
Bowmans Creek flow gauging station.	• Potential tilting of the weir and structural cracking of the concrete may affect accuracy of the flow gauging station.	• Remedial work to ensure accurate operation of the weir and flow gauging station, if necessary.
Narama dam, 280 m west of MW9.	• Imperceptible impacts at Narama dam.	• Maintain the safety of the dam in accordance with DSC requirements. • Monitor using the existing network of survey pegs around Narama dam at completion of each longwall/miniwall.
Hunter River, located 520 m south of MW9, and its alluvium.	• No impacts are predicted.	• None required.
General surface cracking across the site	• Surface cracking over MW9 which could allow ingress of surface water, ponding and erosion.	• Filling of cracks.

Subsidence impacts associated with LW/MW9 would be greatest over the proposed longwall section, with the majority of impacts occurring on land owned by Macquarie Generation. The Department recommends that the proposed monitoring and remedial measures be implemented through a Subsidence Management Plan covering LW/MW9. The SMP should be developed and the measures implemented in consultation with Macquarie Generation and Xstrata, wherever appropriate.

Repair of damage caused to public or privately-owned infrastructure is managed by the Mine Subsidence Board (MSB) in accordance with the *Mine Subsidence Compensation Act 1961*. The Department received correspondence from the MSB drawing its attention to issues raised by Ashton in respect of proposals by Xstrata's Ravensworth Operations to use Brunkers Lane for its proposed relocation of Lemington Road (see Table 1). Ashton, not unreasonably, considers that either Ravensworth or the MSB should be responsible for any necessary remediation of subsidence impacts under Ashton's existing consent (from either the Pikes Gully seam or below) if Brunkers Lane is upgraded. That is, while Ashton accepts that it should be responsible for any impacts on Brunkers Lane as it currently exists, it does not consider that it should be responsible if the road is upgraded for an expanded purpose. The Department agrees with this position, and has included a condition which limits Ashton's liability in respect of any future upgrade of Brunkers Lane.

Ref. No.	Subsidence Impacts (per Sect 6.2.4)
1	Bowmans Creek and associated alluvial
2	Hunter River
3	New England Highway
4	Powerline fibre optic cable
5	132kV and 66kV electricity lines
6	Local area electricity line
7	Telstra underground cable
8	Bowmans Creek flow gauging station
9	Brunkers Lane (private road)
10	Macquarie Generation access road
11	Macquarie Generation sedimentation ponds
12	Polyethylene water pipes / tailings pipes
13	Narame Dam
14	Proposed Water Storage Dam (Ravensworth Vold 5 flyash dam)
	Ashton Infrastructure comprises fences, a farm access track & tailings pipelines.

Legend	
	Ashton Mining Leases
	Subsidence Contour (depth in mm)
	Powerlines
	Local Powerlines
	Fibre Optic Cable
	Telstra U/G Cable
	Polyethylene Water Pipe
	Road
	Pond / Dam
	Dam Notification Area
	Bowmans Ck. Alluvium Boundary
	Bowmans Ck. Saturated Alluvium Boundary
	Bowmans Ck. Saturated Alluvium

0 100 200 300 400 500
All measurements are in metres

The map displays the subsidence impacts of the proposed Water Storage Dam (Ravensworth Vold 5 flyash dam) on the surrounding infrastructure and environment. Key features include:

- Infrastructure:** Ashton Mining Leases, Powerlines, Local Powerlines, Fibre Optic Cable, Telstra U/G Cable, Polyethylene Water Pipe, Road, and Dam Notification Area.
- Roads:** Brunkers Lane, Macquarie Generation access road, and New England Highway.
- Water Bodies:** Bowmans Creek, Hunter River, and Narame Dam.
- Subsidence Contours:** 500mm, 1000mm, 1500mm, 2000mm, 3000mm, 4000mm, 5000mm, 6000mm, 7000mm, 8000mm, 9000mm, 10000mm, 11000mm, 12000mm, 13000mm, 14000mm, 15000mm, 16000mm, 17000mm, 18000mm, 19000mm, 20000mm, 21000mm, 22000mm, 23000mm, 24000mm, 25000mm, 26000mm, 27000mm, 28000mm, 29000mm, 30000mm, 31000mm, 32000mm, 33000mm, 34000mm, 35000mm, 36000mm, 37000mm, 38000mm, 39000mm, 40000mm, 41000mm, 42000mm, 43000mm, 44000mm, 45000mm, 46000mm, 47000mm, 48000mm, 49000mm, 50000mm, 51000mm, 52000mm, 53000mm, 54000mm, 55000mm, 56000mm, 57000mm, 58000mm, 59000mm, 60000mm, 61000mm, 62000mm, 63000mm, 64000mm, 65000mm, 66000mm, 67000mm, 68000mm, 69000mm, 70000mm, 71000mm, 72000mm, 73000mm, 74000mm, 75000mm, 76000mm, 77000mm, 78000mm, 79000mm, 80000mm, 81000mm, 82000mm, 83000mm, 84000mm, 85000mm, 86000mm, 87000mm, 88000mm, 89000mm, 90000mm, 91000mm, 92000mm, 93000mm, 94000mm, 95000mm, 96000mm, 97000mm, 98000mm, 99000mm, 100000mm.

9

Ashton also proposes to remove existing consent conditions relating to subsidence management. These conditions represented the Department's best practice at the time they were first applied (October 2002). Since that time, both the Department and DII have sought to continually improve the management of subsidence impacts and environmental consequences by improved conditions of consent, as well as by providing for rigorous subsidence monitoring, auditing and reporting mechanisms. In particular, in 2004 DII introduced the SMP approval process that has since applied to all underground coal mines in the State. The SMP process is a comprehensive environmental impact assessment process that addresses the risk, management and mitigation of subsidence impacts and allows for substantial community consultation and input.

The DII's SMP process applies to Ashton mine as a condition of its mining lease. This means that Ashton is currently required to implement all of the subsidence management, reporting and notification requirements of its 2002 consent as well as all the requirements of DII's SMP process. The result is that Ashton is required to report the same data, and many aspects of subsidence management, more than once and under differing timeframes, to affected government agencies and other stakeholders.

Ashton has therefore sought to amend the existing consent conditions to ensure consistency with the SMP process and to remove regulatory duplication. However, rather than simply applying DII's existing SMP process as a corresponding condition of consent, the Department believes that the best interests of the community, regulators and Ashton would be served by taking into account the Southern Coalfield Inquiry's recommendations in rationalising the mine's subsidence-related conditions of consent.

The Department has therefore recommended conditions of consent that provide for a future SMP approval process at Ashton mine that is based on:

- a minimum of 2 years of baseline data for significant natural features, collected at appropriate frequency and scale;
- identification and assessment of significance for all natural features located within 600 m of the edge of secondary extraction;
- a clear description of subsidence effects, subsidence impacts and environmental consequences;
- increased transparency, quantification and focus in describing anticipated subsidence impacts and consequences;
- acceptability of impacts under the SMP process being determined within a framework of risk-based decision-making;
- ensuring that the mining company consults with key agencies as early as possible in the mine planning process and consults with the community in accordance with applicable current industry and Government guidelines;
- providing for management, monitoring and contingency plans for all significant man-made and natural features which may experience subsidence effects, subsidence impacts or environmental consequences, including dwellings and buildings; roads, electrical, communications and other infrastructure; landscape; groundwater; terrestrial flora and fauna and ecology (including any threatened species and their habitats); and Aboriginal and other cultural heritage;
- preparation in accordance with any guidelines for SMPs developed by the Department and/or DII;
- approval prior to the carrying out of any underground mining operations that could cause subsidence in the relevant area (including related gateroads, but not main headings); and
- implementation to the satisfaction of the Director-General of DII.

Based on this recommendation, the Department also proposes to delete the following conditions from Schedule 2 of the consent:

- 3.18 – Subsidence Environmental Management Plan;
- 3.24, 3.25 & 3.28 – Subsidence Monitoring and Impact Assessment Reports;
- 3.26 – restriction on applying for further longwall panels that could impact on Bowmans Creek until LW1 to 3 (Pikes Gully seam) have been completed; and
- 3.27 – provides a sequence for submitting subsidence monitoring and impact assessment reports and applications under section 138 of the now-repealed *Coal Mines Regulation Act 1982*.

5.2 Surface Water

Bowmans Creek is the main surface water feature of the area above MW9. Bowmans Creek drains into the Hunter River south of the underground mining area, with 5 km of its length located over Ashton's mining lease. The creek is a perennial stream which receives a small baseflow contribution from groundwater. Monitoring has shown that the creek has a median flow of about 2.5 megalitres per day (ML/day) and is moderately saline, due to the Permian coal measures contributing saline groundwater baseflow.

MW9 is located below Bowmans Creek, with the panel width of 93 m designed to minimise impacts on the creek and alluvium. The predicted maximum vertical subsidence from MW9 (approximately 200 mm) is predicted to impact on a 50 - 100 m length of Bowmans Creek (see Figure 4).¹ Associated compressive and tensile strains of up to 3 - 4 mm/m are predicted, but SCT predicts that these are unlikely to cause impacts (ie evident cracking) in the creek channel.

Changes in stream flow may occur due to losses of groundwater from the alluvium to the coal measures resulting in reduced baseflow (see section 5.3). The predicted losses from mining LW1 – LW/MW9 would be 1.2 l/s or 0.1 ML/day. The loss of baseflow attributable to mining LW/MW 9 is a very low proportion of this total (see section 5.3). The EA estimates that the overall loss equates to a 4% reduction in median flows, but up to 27% reduction in low flows during worst case drought conditions.

Local tilting of up to 11 mm/m may cause minor sideways shifting of the stream within its bed. Consequent impacts which may result are minor, but include changes in stream flow, water quality and channel morphology, such as:

- minor changes to creek channel morphology and ponding, including redistribution of alluvial material within the existing pool and riffle sequences; and
- increased bank loosening and instability of existing steep erosion banks, but with a low probability of any major channel changes to channel cross-section or location.

These changes are considered to be small and within the natural variation of the creek. Water quality changes would be minimal and may include reduced salinity loads in the creek as flows from the saline coal measures to the alluvium would reduce. The Department considers that the incremental impacts on Bowmans Creek likely to result from mining LW/MW9 are minimal, and would be adequately managed through existing conditions of consent.

5.3 Groundwater

The EA includes a specialist groundwater impact assessment prepared by Aquaterra Consulting. The assessment noted two groundwater systems, comprising a shallow groundwater system within the Bowmans Creek alluvium and a deep groundwater system within the Permian coal measures. The systems are separate and have differing water quality, with the alluvial system the more valuable resource compared with the saline system in the coal measures. Groundwater modelling predicted impacts on both systems, which are set out in Table 3.

¹ The EA incorrectly reports this length as 5 – 10 m.

Table 3: Groundwater Impacts

Aspect	Predicted Impact
<i>Alluvial groundwater system (shallow)</i>	
Inflow or leakage of water from the alluvium into the mine workings	Flows from the alluvial groundwater into the underground mine workings are already occurring and are predicted to increase with LW/MW9. However, this increase is very small. Total inflow predicted after extraction of LW/MW9 is estimated at 1.45 - 1.55 ML/day which is an increase of 0.02 ML/day on the level predicted following mining of MW8. These predictions are lower than in the 2001 EIS. The increase is minor and would be managed via the existing approved groundwater monitoring regime and mine water management system.
Changes in baseflow for Bowmans Creek and Hunter River	Baseflow in Bowmans Creek would be reduced during mining due to inflows from the alluvium into underground workings and the drawdown of groundwater from the coal measures. Total reduction predicted during extraction of LW/MW9 is predicted to be 1.1 - 1.2 l/s, compared with 0.7-1.1 l/s during extraction of MW8. This is considered a minor incremental increase. These predictions are also substantially lower than in the 2001 EIS, the basis of the current consent.
Groundwater storage volumes within Bowmans Creek alluvium	Groundwater levels within the Bowmans Creek alluvium are already being drawn down by approved mining. Predictions are that the groundwater level would be reduced by a maximum of 0.8 m during mining of LW/MW9, compared with 0.7 m during extraction of MW8. This increase is considered to be minimal. The 0.8 m reduction equates to a 12% loss in the overall volume of saturated Bowmans Creek alluvium (from 5.7 million m ³ to 5.0 million m ³).
Changes to surface and alluvial water quality	Up-flow of saline water from the deep groundwater system is likely to reduce slightly due to dewatering of the coal seam during mining. This may cause a minor, temporary improvement in surface and alluvial water quality.
<i>Coal measures groundwater system (deep)</i>	
Saline groundwater drawdown	The Pikes Gully seam is predicted to have been substantially dewatered during mining of LW1 - MW8, hence there would be minimal additional drawdown associated with LW/MW9.

The importance of avoiding impacts on Bowmans Creek and alluvium was a key issue during assessment of the mine's development application in 2002 and was raised again by both DECCW and NOW in current submissions. NOW recommended that existing consent conditions, which require that mining is undertaken without causing direct hydraulic connection between the alluvium and the mine workings, remain in place. DECCW recommended that mining be prevented from causing connective cracking to ensure protection of the endangered population of River Red Gums to the south.

Ashton proposes to mine beneath Bowmans Creek and alluvium using miniwall mining methods, based on providing a panel-width to overburden-depth ratio of less than 0.6. This ratio was developed to provide an adequate depth of cover between the alluvium and the coal seams, such that connective cracking would not cause a direct hydraulic connection between the two groundwater systems. The Department and other key agencies accept the EA's predictions that this mine design is appropriate to minimise or avoid connective cracking and hydraulic connection.

However, NOW raised concerns that the change-out point from miniwall to longwall mining was too close to the creek and alluvium, risking unacceptable impacts, and recommended that the change point be located 50 - 100 m further north. While Ashton maintains that its original proposal would not impact Bowmans Creek alluvium, it has agreed to retract the change point 50 m further north (see Figure 3).

The predicted reduction in baseflows of 1.2 l/s associated with mining of LW1 – MW9 was noted by NOW to be inconsistent with the requirements of the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009*. NOW therefore recommended that Ashton account for and replace the loss of baseflows in Bowmans Creek as a result of underground mining. The Department notes that this instrument was not in place when development consent was granted in 2002, that the proposed LW/MW9 is located within the existing consent boundary and that its extraction is predicted to add only incrementally to baseflow loss associated with existing approvals. NOW has accepted the Department's

position that, in these circumstances, it is not appropriate to require Ashton to account for baseflow losses for mining in the Pikes Gully seam.

NOW also requested that the loss of saturated thickness in the alluvium should be regularly measured and reported annually and that losses greater than trigger levels should be remediated. The Department agrees that saturated thickness is a key parameter and should be monitored regularly. NOW has also accepted the Department's position that, for similar reasons to those noted above, it does not consider it appropriate to impose requirements to remediate losses, which were in reality approved in 2002.

The Department considers that the predicted impacts on alluvial groundwater associated with extraction of LW/MW9 are very small. Risks have been further ameliorated by the 50 m pullback in the change-out location for the miniwall. With implementation of updated conditions relating to groundwater management, groundwater impacts from LW/MW9 can be effectively monitored and managed.

5.4 Aboriginal Heritage

An assessment of Aboriginal heritage within the area of LW/MW9 was undertaken by Insite Heritage. The assessment drew on information from previous archaeological studies of the broader Hunter Valley and the Ashton mining lease, consultation with Aboriginal stakeholders and recent field surveys.

Previous archaeological studies indicated the presence of four significant sites within the mining area. These include the Brunkers Lane site, located approximately 100 m east of LW9; and the Waterhole, Ashton Homestead and Oxbow sites all located over 750 m east of LW/MW9. The Brunkers Lane site is rated as 'high' significance, however impacts are not expected from mining LW/MW9. The other sites are clearly too distant to be impacted by the modification. Previous studies have also noted the potential for significant sub-surface deposits along the terraces associated with Bowmans Creek.

Field survey was carried out on 17–18 December 2008 with 17 Aboriginal stakeholder individuals/groups in attendance. The survey identified seven archaeological sites containing a total of 23 artefacts over the area of LW/MW9. The seven sites comprised two artefact scatters and five isolated artefacts, all of which were rated as 'low' significance. Predicted impacts would be primarily due to potential subsidence cracking of the land surface. Remedial measures, such as ripping and filling of cracks to prevent erosion and ponding of water, also have the potential to disturb or bury artefacts. To minimise these impacts, the following measures were proposed by Ashton:

- regular monitoring of the two artefact scatter sites (LWA2/1 and LWA4/3) by the Aboriginal community, with the opportunity for recording and relocating sites if they are adversely affected by subsidence;
- regular monitoring of subsidence impacts on the floodplain and terraces of Bowmans Creek by an archaeologist; and
- obtaining approval from DECCW under Part 6 of the *National Parks and Wildlife Act, 1974* prior to undertaking rehabilitation of any surface cracks in the area between Bowmans Creek and Brunkers Lane, which contains six of the seven identified sites.

Provided the above recommendations are implemented, the Department is satisfied that subsidence related impacts on identified archaeological sites would be minimal and effectively managed.

5.5 Other Issues

Other environmental issues associated with the proposal are considered in Table 4.

Table 4: – Assessment of other issues

Issue	Potential Impacts	Consideration
<i>Aquatic flora and fauna</i>	- Bowmans Creek provides significant aquatic habitat, however bi-annual monitoring indicates that the creek is already severely to moderately impaired, principally by clearing, agricultural activities and runoff. 14 fish species have been recorded in Bowmans Creek, including two introduced species. No listed threatened fish or aquatic invertebrates are recorded. - Impacts from subsidence include a minor reduction in baseflows, deeper or new pools due to lowering of the creek, potential improvement in water quality due to reduced saline water contribution from groundwater and increased sedimentation and turbidity due to erosion of surface cracks. - These impacts may affect fish passage and refuge, however the predicted impacts are considered to be minor, given the limited subsidence of 0.2 m in this area.	- Restricting the MW9 panel width to 93 m under the creek and alluvium would minimise subsidence related impacts to aquatic habitat and fauna. - Ensuring no direct hydraulic connection between the alluvium and the mine workings would limit impacts associated with water availability and quality. - Ashton has committed to continue riparian rehabilitation works along Bowmans Creek which would minimise impacts resulting from erosion of surface cracks and bank instability. - Existing water quality and aquatic ecology monitoring programs should monitor LW/MW9 impacts, prior to, during and post mining. - With implementation of the above measures, the Department considers the impacts on aquatic flora and fauna would be minimal and any changes in habitat or water quality could be identified and effectively managed.
<i>Terrestrial flora and fauna</i>	- An endangered population of River Red Gums is located along Bowmans Creek approximately 75m south of MW9. - Seven listed vulnerable fauna species are known or likely to occur in the area. Five listed migratory species may utilise the area as foraging habitat. - Potential subsidence impacts include trees leaning or falling, ponding of water and waterlogging of vegetation, reduced alluvial groundwater depth, alteration of surface drainage and clearing for remediation of surface cracks. - Seven-part tests concluded that the level of subsidence would not significantly impact the River Red Gum population, vulnerable species or Commonwealth listed migratory species.	- The reduction in panel width beneath Bowmans Creek would minimise subsidence impacts on significant fauna and habitat. - The existing Flora and Fauna Management Plan should incorporate management measures for remediating subsidence impacts associated with LW/MW9. - Existing monitoring programs should be updated to include monitoring of vegetation and fauna prior to, during and post mining of LW/MW9. - Ashton has committed to continued implementation of its existing River Red Gum Management Plan. - With updates to, and implementation of the flora and fauna plan and monitoring program, the Department is satisfied that impacts on terrestrial flora and fauna would be appropriately managed.
<i>Noise and Dust</i>	- Mining of LW/MW9 would not contribute significantly to overall noise or dust emissions from the Ashton operations. - Air quality impacts result primarily from Ashton's open cut, which is predicted to contribute some 97% of the mine's overall dust emissions. - The 250,000 tpa production increase would be achieved due to operational efficiencies in the underground mine and increased product coal yield. - The increased throughput in the Ashton CHPP is not expected to result in any significant increase in noise or dust, or any restriction on the mine's ability to dispose of tailings. The CHPP operates 24/5, although the consent permits 24/7 operation.	- The modification would add imperceptibly to the mines existing noise and dust emissions. The modified development is expected to comply with existing noise and dust limits. - Noise and dust emissions would be effectively managed and monitored via existing management plans. - No additional or amended conditions are considered necessary.

6 RECOMMENDED CONDITIONS

The Department has drafted recommended conditions for the modification. Ashton has reviewed and accepted these conditions.

7 CONCLUSION

The Department has assessed the modification application, EA, submissions on the proposal, and Ashton's response to submissions in accordance with the relevant

requirements of the EP&A Act, including the objects of the EP&A Act and the principles of ecologically sustainable development.

The assessment has found that the proposed mining of LW/MW9 would result in minor subsidence, groundwater, surface water and Aboriginal archaeological impacts. These are considered consistent with the approved underground mining operation and could be effectively managed via updates to existing approved management plans. Updating of subsidence management conditions (including removal of outdated conditions) would ensure that subsidence management at Ashton mine is undertaken in accordance with contemporary best practice, remove duplication and simplify regulation of Ashton mine.

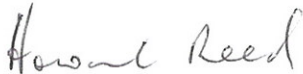
The modification would enable extraction of additional coal reserves beneath Bowmans Creek and alluvium, thereby improving the overall economic efficiency of the underground mining operation. The Department is satisfied that the proposal represents a logical extension to Ashton's existing underground mining operations, and is satisfied that its benefits sufficiently outweigh its costs.

Consequently, the Department is satisfied that the proposed modification is in the public interest and should be approved, subject to conditions.

8 RECOMMENDATION

It is RECOMMENDED that the Director, as delegate of the Minister:

- **consider** the findings and recommendations of this report;
- **determine** that the proposed modification is within the scope of section 75W of the EP&A Act;
- **approve** the application to modify development consent, subject to conditions, under section 75W of the EP&A Act; and
- **sign** the attached instrument of modification to the development consent (Tagged A).



Howard Reed 24.3.10
Manager, Mining



David Kitto
Director, Mining & Industry